

Introduction to Wernher von Braun Weekly Notes

Until their re-discovery in late 2007 at the Southeastern District Office of the National Archives in Morrow, Georgia, the "Von Braun's Weekly Notes" were presumed to no longer exist. The notes were assembled each week throughout the 1960s by the laboratory directors and managers at the Marshall Space Flight Center (MSFC) and provided to Dr. Wernher von Braun, the first Director of the Marshall Center.

The notes cover von Braun's tenure in Huntsville from the early 1960s into the 1970s and have been recognized by many historians as a valuable source of information relating to the Saturn/Apollo era at Marshall and throughout NASA. They were used to track both programmatic and institutional issues and events at the Center. Over the years, many NASA and space historians have located scattered copies of the notes and made reference to them in their work. It is believed that the collection in Atlanta represents a complete set of the notes. During the Saturn era, Marshall line managers solicited weekly notes from each of their subordinate organizations. As the notes passed through the chain of command at Marshall, additions or deletions were made based upon the importance of the issue. Each Monday, von Braun reviewed the notes and made his own notations in the margins. The notes, with von Braun's comments, were then filtered back to the organization deemed responsible for responding to von Braun's inquiry. The notes have attracted attention from space historians as well as historians of organizational communications and management.

An inquiry from the Exploration Launch Vehicle Program Office prompted the renewed search to find the notes. MSFC records management personnel working with National Archives personnel in Georgia were responsible for relocating the notes.

As part of a trip to the National Archives in 2008, Mike Wright, the historian at the Marshall Center, confirmed the identity of the notes and electronically scanned approximately 2,000 pages of the estimated 15,000 pages in the collection. The historian plans to return to the archives in early 2009 with a team of technicians who will scan the remaining portion of the notes and return the electronic copies to the Marshall Center historical archives.

The weekly notes are reproduced in the context they were created. This means that, in many cases, the notes do not include the first names of the individuals that are included in the entries, explanations of abbreviations, or definitions of terms. In this regard, the reader may find it useful to refer to *Stages to Saturn*, a Technological History of Apollo/Saturn published by NASA in 1980 and written and researched by space historian Roger Bilstein for the Marshall Center. You may access *Stages to Saturn* by clicking on the following link: <http://history.nasa.gov/SP-4206/sp4206.htm>

Each page of the notes has been assigned a unique number. These numbers do not appear on the paper copies of the Weekly Notes that are permanently on file at the Southeastern District Office of the National Archives in Morrow, Georgia.

Wernher von Braun Weekly Notes for October 1961

10-2-61

- ✓ 1. SA-1 and SA-2 Command Systems: Electrical inspector will cover replacement of blackballed "TRANSITRON" transistors at Motorola.
2. Contract Review: 313 contracts covering space vehicle FLIGHT material (dollar value of 1.5M) reviewed between August 7th and September 1st.
 - a. 243 - did not have inspection clause.
 - b. 308 - did not specify source inspection.
 - c. 292 - did not specify point of acceptance.
 - d. 307 - did not specify responsibility for making acceptance at MSFC.
 - e. Only 17 - contained a delayed (30 day or less) inspection clause.

The above stresses that procurement review is vital and should be made mandatory.
3. Automatic Checkout System: Design documentation has been received from Packard-Bell and is undergoing evaluation. Early delivery items were put into use for SA-2 pre-static checkout.
- ✓ 4. Saturn Pressure Functional Test Equipment: Bldg. 4708, pressure cell equipment furnished by Lockheed, has been installed, verified and accepted. This gives Quality Division capability of checking two Saturn S-1 stages simultaneously.
- ✓ 5. Douglas - Santa Monica: A Quality representative has been stationed in the resident project office in support of the S-IV effort. A second Quality representative will join the first late in October.
- 2 6. RL-10 Program: Present level of effort at P&WA is down to one man. *→ isn't that critical? Comments please!*
- ✓ 7. Hydrostatic Test Tower: Preliminary plans, developed in cooperation with P&AE Division, have been submitted to OTS.
- ✓ 8. West Extension to Quality Division: Excavation of full basement is 80% complete. Completion date is September 5, 1962.
- ✓ 9. Receiving Inspection: Room in Bldg. 4471 is 80% complete. Quality Division should take occupancy in November which will give MSFC closer control over incoming material.

Bill Davis

I agree with the need for a Quality Division endorsement of the inspection provisions of contracts. Suggest you work out a joint proposal with Grace. I'm willing to do the "selling" to the other divisions. B 10-7

*See copy of progress
NOTES for form.*~~FUTURE PROJECTS OFFICE~~~~Progress Notes for Week Ending September 30, 1961~~**NOTES 10-2-61 Koelle****A. In-House Effort**

✓ 1. On September 20 a presentation was given to the LLVPG by H. H. Koelle, accompanied by J. W. Moody (M-REL), on a method for estimating reliability growth on large launch vehicles. The data presented was well received. Copy of presentation is available. (LLVPG Task No. 003)

✓ 2. Work statements for (1) the extension to the Martin Earth-Lunar Transportation System Study and (2) Comparison of Early Lunar Transportation Modes were reviewed with N. Rafel (OLVP) and requested changes are being incorporated.

✓ 3. At the request of the LLVPG (Frank Williams), an analysis is being started by M-FPO to study the effect of multiple shift operation on the C-4 development program to determine in what areas it is desirable, what it costs, and what time savings can be realized.

B. Contractor Effort

✓ 1. On September 19 STL gave an interim progress review on the Medium Class Vehicle Study (LV-A) at MSFC. It is too early to draw any conclusions from this effort.

✓ 2. Both Rocketdyne and Aerojet gave presentations on September 20 on their effort in nuclear propulsion. Close contact is being maintained with both companies.

✓ 3. On September 27 a program review was held on the Orbital Launch Operations Study, at Chance Vought, Dallas, Texas. This effort was redirected to include the effects of C-4 on the Orbital Operations development program.

✓ 4. On September 27 Martin gave a progress report on their C-3 Launch Operations Study. Based on C-3 considerations, Martin concluded that for the higher firing rates the most economical launch facility was a mobile design based on canals for transportation from assembly building to launch pads. At Dr. von Braun's request, Martin was given data on C-4 so that the effect of C-4 and the effects of a combined C-3 and C-4 program could be determined.

September 29, 1961

H. H. Koelle
H. H. Koelle

Director, Future Projects Office

NOTES 10-2-61 MRAZEK

- ✓ 1. RIFT: "Mid-Term Reviews" were completed this past week. Presentations by Lockheed, Martin, General Dynamics/Astronautics and Douglas on preliminary study contracts involved individual contractor's study efforts, and program summaries. Each MSFC Division was represented.
- ✓ 2. RIFT: Jack Froelich, Space General Corp. (SGC), announced desire to compete on RIFT vehicle. Aerojet General Corp. (AGC) has NERVA engine development but W. Zisch, Executive VP, wrote letter to Scott Fellows stating that there would be no interchange of RIFT/NERVA information between AGC and SGC. (Who believes that?)
- ✓ 3. RIFT: From all appearances, the critical item in the RIFT program is facilities. MSFC needs Hdq. approval to go ahead on conceptual design of vehicle test facilities in Nevada. Also needed is approval on RIFT Contractor Selection Procurement Plan. *→ Scott Fellows: What have we done to get it?*
- ✓ 4. TURBINE SPINNER (H-1): Turbine Spinner started operating in single engine testing during final checkout. Fortunately propellant pre-valves were still closed. Investigations are proceeding to determine cause.
- ✓ 5. MARK 3J TURBOPUMP: Released for SA-7.
- ✓ 6. SA-1 FLIGHT CURTAINS: First flight-type curtain is being tested in Structures Lab. (This is first one made since it was found that curtains originally delivered to Cape did not fit.) Five new flight type curtains to be delivered to Cape on/about Oct. 1. Spares to be delivered to Cape on/about Oct. 11. It was proposed that the first five revised version engine curtains for SA-1 be fitted at the Cape on the evening of Monday, September 25, 1961; however, this could not be done since it would have involved the chartering of a commercial aircraft (from Arrowhead to the Cape) at a cost of \$20,000. I disapproved this. (The normal airfreight does not fly on Saturday night unless it has a full load. It did not have a load and would thereby require a special charter.)
- ✓ 7. FLEXIBLE CURTAIN MATERIALS PROGRAM: Contract with Goodyear Aircraft Co. to be in effect within 10 days. Level of effort \$120,000 /yr. This includes money recovered from cancelled Paraglider materials study. (Also with GAC)
- ✓ 8. Y-1 (1000K O₂H₂ ENGINE): Program go-ahead received from NASA Hdq.
- ✓ 9. ENGINE CONSULTATIONS: Pratt & Whitney were here on a technical review with Douglas and Convair. Cold flow tests of two engines on the vertical test stand were started.

10-2-61
 NOTES - ~~2 October 1961~~ - Stuhlinger (RPD)

1. Launch Vehicle Technology Program: The MSFC Launch Vehicle Technology Program for FY 1962 was approved at a level of \$8.115 million. Of this amount, \$6.301 million was authorized for 1st and 2nd Quarters. Nineteen contract actions are being processed or have been completed, committing \$.995 million of FY 62 funds. Further contract actions are underway.

Subject
 2. Work on determining the spatial orientation of S-15 using R.F. patterns is progressing. This work has been completed for the first three months of satellite lifetime. The accuracy of this determination, which was developed by RPD for the Explorer IV Satellite, is on the order of 2° . It appears that this technique is far superior to the horizon scan method originally intended for this satellite.

3. Electric Propulsion Engine Development: I attended a press conference at Hughes Research Laboratories, Malibu Beach, California, on Sept. 27, where the operation of the Hughes cesium ion engine developed under MSFC contract was demonstrated to the press. This engine is intended for the first Scout flight test in Fall 1962. Thrust is 1.6 millipounds at 8000 seconds I_{sp}.

Subject
 4. Members of Headquarters, OLVP, and of MSFC (including myself), visited RCA in Princeton to discuss the status of the flight test capsule contract. Close working relations between the engine developers and RCA had been established earlier. Work is progressing satisfactorily.

5. SNAP 8 Flight Test: A scope of work covering a conceptual design study for the SNAP 8 flight test system has been prepared by Dr. Johnson and his Working Group, but H.Q. has not yet provided any funding authorization to permit us to initiate this work. Two or three contractors will be selected for the initial studies, and approximately \$300,000 will be required to support this effort. I plan to discuss our need for release of funds with Mr. Tom Dixon on October 3. Also, I hope to discuss with Mr. Dixon the future role of MSFC in the NASA Electric Propulsion Program.

6. Papers Completed: Mr. J. W. Keller, "Uncertainties in Space Radiation Shielding Calculations", and Dr. Ilmars Dalins, "Basic Data on Surface Ionization and Implications for Ion Generation in Cesium Ion Rockets."

7. Interesting Work in Progress: Mr. Martin Burrell - development of basic data on the heat deposition by and thermalization of neutrons in liquid hydrogen; Mr. Joe King and Dr. E. Stuhlinger - study of a manned-Mars mission with electrically propelled vehicles; Mr. J. Downey, Mr. S. Fields, and Dr. E. Stuhlinger - the problem of optimization of electric propulsion systems and Dr. R. Shelton, Mr. R. Potter, Mr. L. Lacy, and Dr. E. Stuhlinger - the effect of velocity distributions on power-limited propulsion system.

NOTES 10-2-61 Geissler

~~Progress Report by Aeroballistics Division for Data, von Braun~~~~October 21, 1961~~

(Subject)

✓ 1. A Large transient control deflections caused by steps in pitch angular rate of deflection program required a modification of SA-1 tilt program to reduce number of steps and insure continuity of slope through q_{max} region. Engine out capability will not be guaranteed, especially during q_{max} region, since such a guarantee would require too drastic wind restrictions. However, with moderate wind restrictions (90%) probably a reasonable chance for completing the mission even with engine out will probably be obtained during a major portion of the flight.

✓ 2. A Discussions with members of STG took place concerning payloads on SA-5 & 6. There is concern about (a) too little stiffness which would impair angle of attack control and (b) aerodynamic buffeting caused by escape tower and blunt payload geometry. STG will study new designs with stiffened tower and eventually with shroud. Numerical values of buffeting will be determined. It is questionable whether an acceptable design will be available on schedule.

✓ 3. A Studies on base heating for a C-4 booster indicated that reasonable values ($< 60 \text{ Btu/ft}^2 \text{ sec}$) can be obtained by moderate spacing of engines, on a symmetrical pattern. Radiative heat input probably somewhat larger than convective, predictions based on NAA & Air Force measurements on H-1 engine.

✓ 4. A A decision was made to transfer the Vacuum facility (low vacuum with cryogenic pumping) which was in 1961 budget for Aeroballistics Division to Test Division, which will incorporate it into Component Test facility and will operate it. A design study contract by A. D. Little, monitored by Aeroballistics Division, has been conducted, and verified the technical validity of concept. Aeroballistics Division will continue to help in technical development of facility and plans to use it part-time for low density tunnel tests and rocket exhaust test chambers, along with tests by other divisions which will use it as vacuum-chamber. An MSFC committee for coordination of test requirements in very low pressure facilities has been proposed.

~~E. D. Geissler~~~~Director, Aeroballistics Division~~~~Copies to~~~~1 - Mr. von Braun~~~~2 - Mr. Geissler~~

NOTES 10-2-61-HEIMBURG

Subject

✓ 1. Preparations for static firing of SA-2 is on schedule. No serious trouble encountered. In general, condition of SA-2 much better than SA-1. Propellant loading test to be performed on Oct. 3.

✓ 2. Initiated contract to modify barge "Compromise" in time to meet SA-2 shipment. Includes steel cargo cover, ballast system, and miscellaneous improvements.

✓ 3. General Mills, Inc. presented the final report on the "Feasibility Study of an Aerocap-Supported Meteorological Measuring System". They find that the captive balloon is a possible, but not the best, solution. General Mills proposes a rawinsonde observation system which, after major modification, is capable of providing meteorological data for short-period forecasts of sound propagation. This solution is similar to what M-AERO and M-TEST are preparing together right now.

✓ 4. Premature Ignition occurred September 27 on the Power Plant Test Stand; no damage. Investigations to date have given no indication of cause. A meeting will be held October 2, 9:00 a.m., between Test, S&M, and G&C Divisions to review investigations thus far and establish additional investigations to be carried out.

✓ 5. Study in progress to determine requirements for modifications or replacing the undesirable elevator control system at the Dynamic Test Facility. *km*

✓ 6. Field construction of the West Area Static Test Stand foundations were suspended due to changes required to facilitate employment of the increased diameter C-3/C-4 boosters with specified engine cant and gimbal angles. After approval of NASA Headquarters, work can be resumed in from 3 to 6 weeks. The stand design changes will cost approximately one million dollars. Site improvements, blockhouse, and tunnel foundation work proceeding on schedule.

10-9-61

MEETING OF THE NASA COMMITTEE ON MISSILE AND SPACE VEHICLE AERODYNAMICS


1. The NASA Research Advisory Committee for Missile and Space Vehicle Aerodynamics held a meeting at MSFC with Aeroballistics Division as host. Main topic was launch vehicle aerodynamics and presentations were given by MSFC personnel as follows: a. Saturn Missions and Schedules - Geissler; b. Flight Hazards Caused by Application of Hydrogen as Fuel - Dahm; c. Saturn Base Heating Work - Wilson; d. Design Parameters of Saturn Paraglider Recovery System - Linsley; e. Aerodynamic Environment - Vaughan; f. Analysis of Certain Types of Heat Protection for Re-entry from Lunar Flight - Adams. The recent cancellation of the 4 Atlas-Agena supercircular re-entry vehicles was quite resented by Langley Research representatives (who were in charge of payload preparation) and other members of the committee. Dr. H. G. Stever (MIT), chairman of the committee, explained that Dr. Seamans had informed him that this program was dropped in view of lack of funds (about \$27 million this year, \$50-\$60 million total) and based on statements by STG, that they do not feel this program to be vital for the success of the Apollo capsule development. (Their position is that the contribution by radiation to the total heating is probably below 30% of total and they can absorb this by conservative design.) STG committee member, Mr. Faget, was not present. No firm challenge to the STG statement was made with respect to present Apollo program, but it was requested that STG explain their position in a special briefing and it was pointed out that further development of Apollo as well as other very high speed missions such as planetary flights would make a definite knowledge about the phenomenon of high speed heating mandatory. Dr. Stever and a few members of the committee will try to get together with Dr. Seamans and try to have him reinstate at least part of the old Atlas-Agena program plus eventually a re-entry missile on a Saturn C-1 (the Atlas-Agena flight was scheduled for early 1963). The interest in parabolic and even higher re-entry speeds makes use of S-I, S-IV and modified Centaur stage (S-V) attractive. ✓

APOLLO VEHICLE FIN SIZE CHANGE

2. A decision was made to reduce the span width of the fins on Saturn C-1 Block II Apollo vehicles to a value corresponding to about 121 ft² area instead of 182 ft². This actually reduces the maximum required engine deflections in presence of wind insofar as it produces a nearly neutrally stable situation in the q-max region. For eventual Dyna Soar mission the old fin size will be used. ✓

NOTES 10-6-61 ^{GRAU} ~~QUALITY~~

B 10-12

1. SA-1 Outboard Curtain Installation: Mechanical Branch personnel will monitor installation at LOD. Based on gimbal operations observed at S&M Division, it is anticipated that this installation will, at best, be only marginally acceptable, due to binding action between the chamber and the structural members supporting the curtain assembly. ✓
 2. SA-2 Short Duration Firing: Information on thirty critical vibration channels will not be obtained during the test Tuesday due to unavailability of Telemeters 7 and 8. ✓
 3. Automatic Checkout Equipment: Packard Bell has conducted a familiarization course on delivered equipment for Quality personnel. ✓
 4. Second Saturn Electrical Checkout Complex: Installation of this station is 30% completed and the design is 80% complete. Target date for completion is December 1, 1961. This will give Quality capability of checking two Saturn vehicles parallel. ✓
 5. Centaur Project: Vehicle C-1 is now installed in static test facility S-4 at Sycamore Canyon. LOX tanking tests were performed September 26th. Cold flow with LOX and LN₂ are scheduled for October 10th. LH₂ and LOX tests scheduled for October 18th. ✓
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NOTES 10-7-61 HAEUSSERMANN

B10-12

1. Weekly Notes: This means of providing a direct communications link with M-DIR has been very well received by all G&C Branch and Office Chiefs. Each has been asked to advise my office of any significant event, situation or action in their respective areas which can be considered for inclusion in a consolidated submission; as a result, this communication link in effect serves a dual purpose.

2. SA-1 Review: During the meeting on Oct. 6, a goodly portion of the noteworthy items for this week were covered. However, several items of general interest could be mentioned.

3. General Interest Items:

a. Personnel at Cape: Eight persons are presently at the Cape in support of SA-1. Sixteen more will depart during the week of Oct. 8.

b. Green Mountain RF Propagation Test Facility: Mr. Hoberg, during his planned meeting with you on Oct. 6, intended to cover the problems of long standing regarding this facility. I need only say here that a favorable decision defining the future of this facility is urgently needed. The personnel manning it and those concerned with RF-R&D (in which the facility has a vital role) cannot be expected to continue their efforts indefinitely under prevailing conditions.

c. Visit of Director of Range Operations: Director of Range Operations, Col. Thompson, and RSO, Capt. Jones visited Lee Malone of RF Systems Section, Inst. Dev. Br., on Oct. 4 to review steps taken to ensure reliable operation of command receivers for SA-1. Information on modification of command sets and results of environmental testing were stated as being very satisfactory and acceptable. Serial numbers of sets to be flown and used as spare for SA-1 were furnished for identification check at PAFB.

d. Telemetry Modification and Azusa Check: Modification of TM boards has been completed and Azusa system has been checked for Transistron 2N335 transistors with a negative result.

e. Rendezvous Simulation: The study and preliminary design work on this facility has progressed to the point where a status review and concept approval is necessary before detail design work can be initiated. Arrangements have been made with Mrs. Holmes to give you a status report on Oct. 25.

f. PERT Symposium: Jointly sponsored by AIEE and University of Alabama Oct. 3 - 5 symposium was attended by twelve (12) G&C personnel.

General Comment of Attendees: We have a much better understanding of what PERT is and what it can do as a management tool.

Mac
Please
write
week by
B
10-12
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Intg was
held 4:30
was afternoon

B10-12

NOTES 10-9-61-HEIMBURG

1. Premature Ignition, PPTS. Intensive investigations conducted in conjunction with S&M and G&C to determine cause of premature ignition; to date, nothing conclusive found, but possible cause seems to be electrical component partial failure, coupled with unusual electrical supply condition. The statement made in the Saturn meeting that the cause was human error is not correct. An electrical circuit modification that conforms with the SA-1 launch procedure will be made on future engines.
2. SA-2. Progressing on schedule. An unusual number of LOX leaks on small fittings were encountered, but were successfully corrected (static firing set for 10-10-61, 4:40 p.m.).
3. Dynamic Stand. Series of tests to determine bending modes in yaw direction to be conducted this week will conclude present SA-D testing program.
4. Liquid Hydrogen Facility. Cold flow tests were conducted using LN₂. Several discrepancies found; will be corrected and test with LN₂ repeated. Plan to conduct LH₂ cold flow test around October 20.
5. SA-1. Three men from Component Test Section "A" were sent to Cape Canaveral over the weekend to replace the leaking LOX pump seal on SA-1 engine No. 2.
6. West Area Static Test Stand. Status on stand design changes unchanged; still pending approval of NASA Headquarters. Two factors that are delaying Headquarter's approval seem to be: the inability to test in West Area with high noise levels generated by four F-1 engines and consideration of the proposal to transfer construction to the planned Coastal Testing Area.

222

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ake
this
up with Heimburg direct
B

Done in Board meeting today
Jan 10-18

NOTES - 10-9-61 - Koelle

B₁₀₋₁₂FUTURE PROJECTS OFFICEProgress Notes for Week Ending October 7, 1961A. In-House Effort

1. At the request of the LLVPG (Mr. Williams), a study of historical data on solid-motor development programs has been started. This study will provide background on which to base estimated development times, number of static tests required, etc. on future programs.

B. Contractor Effort

1. A contract was signed with Lockheed on the Earth-Planetary Transportation System Study. The purpose of this study is to provide information necessary to assist NASA in determining future launch vehicle requirements. The main emphasis will be on a survey of interplanetary trajectories of particular interest. The contractor orientation is scheduled for October 18, 1961.

W. J. Koelle
Deputy Director, Future Projects OfficeOct. 7, 1961

NOTES 10-9-61 MRAZEK

B10-12

1. Heat Protection on SA-2 and Subsequent: Beginning with SA-2 there will be selective replacement of X-258 covered areas with asbestos and reflective tape (examples: access chute, cantilever shrouds). A considerable weight saving is expected.
2. Pressure Decay Problems: Studies are continuing to develop a simple means to eliminate pressure decays (due to recondensation) in vehicle tanks with small ullages, as in SA-5.
3. Hardware Qualification for SA-1: All propulsion and mechanical hardware qualification for SA-1 will be completed by the end of this week.
4. A-1 Engine: Pratt and Whitney has finally gone on record stating that the A-1 engine will not meet the specification requirements in these and other areas:

	<u>Available</u>	<u>Specification</u>
a. Overshoot	approx. 20%	10%
b. Cutoff Impulse Variation	500 lb-sec	140 lb-sec
c. Engine Weight	up 20 lb.	-
d. Cool-down Valve Leakage	15 lb/min	2 lb/min

These facts must hurt the Centaur very seriously. Convair/Astronautics comments expected by Thursday. No remedial action in sight on the part of Pratt and Whitney in the foreseeable future.

5. Vehicle Growth Potential Study for Golovin Committee: The Future Projects Design Branch of S&M Division is currently investigating the use of the C-4 vehicle for NOVA payloads under two conditions:

- C-4 - Nuclear
- C-4 with ten 156-inch diameter solid motors wrapped around the S-I-C booster. This requires an air start of the F-1 Engine.

6. Reliability Program: Due to very significant fund reductions in FY-62, the reliability program on Saturn C-1 components has been greatly reduced. In order to accomplish the reliability testing on all Category I items (items in which failure would cause loss of vehicle) during FY-62, this Division requires 5.58 million dollars. The total funds available are 1.417 million dollars.

Discuss w/ Eberhard Kees

Get detailed briefing requested 10/19/61

Hucker comments for about A-3?

Agreed to Hucker 10/19 for comments.

NOTES - 10/9/61 - KUERS

B-12

1. Saturn C-1 Program

- Mac*
Let's run this setup
- a. SA-1- Crew sent to Cape Canaveral to install modified engine curtains on S-I Stage.
- b. SA-5- Full scale top tank mock-up completed and assembled to S-IV mock-up section furnished by Douglas. This assembly will be used for engineering review and analysis of interface problems.
- What's that?* → c. Second source for wrap-around-interconnect systems and vent-pressure systems being finalized with Solar Aircraft and Arrowhead Products respectively. Eventually this will eliminate dependence on single source and will provide increased industry capability for higher production rates.

2. Saturn C-3 Program

Get detailed briefing

Preliminary structural fabrication schedule developed and evaluated to determine pacing items in tooling and fabrication. Analysis indicates Bulkhead fixture more critical than hydrostatic test tower.

3. R&D Activities

- Get briefing (what's that?)*
- a. Studies completed on application of capacitor stored energy to swage joints as means of assembly and repair of space vehicles in orbital operations. Technique developed employs new principles. Patent applied for.
- b. Completed brochure for Army Ordnance Missile Intelligence on "Welding and Fastening Techniques in Missile Fabrication". Will be used for identification of alloys and thickness of material from size of rivet heads, rivet pattern and weld beads.

4. Equipment

First numerical control equipment installed in division. Will increase flexibility of development work by elimination of need for large number of drill jigs and small tools.

Buddie
Ask Kuers for one briefing in Feb Lab to cover all of the above
Requested 10/19/61
Jan 10-18

10-9-61
 NOTES - ~~9 October 1961~~ - Stuhlinger

B10-12

1. Prior to the establishment of MSFC, the Research Projects Division engaged in some space science activities. During the past year these activities have been curtailed, since MSFC had no clear mission in space science. Under the new NASA organization, MSFC seems to have a broader scope. Therefore, the Research Projects Division would like to propose a modest space science program in those areas where a unique competence exists at MSFC. This proposal would be submitted to the Office of Space Science for consideration. Would such a move be agreeable to you? ACTION REQUIRED.

2. Electric Propulsion Program: The MSFC Electric Propulsion Program for FY-1962 was approved at a level of \$7.100 million, plus an additional .693 million of FY-1961 funding reprogrammed to FY-1962. Funding authorizations totaling \$6.151 million for 1st and 2nd Quarter requirements have been received. Twenty-three contract actions are currently being processed or have been completed, committing 4.099 million of FY 62 funds.

3. The Plasmadyne Corp. has assembled the first complete arc engine consisting of thruster, cryogenic tank for supercritical hydrogen propellant, hydrogen feed system, thermal controls in tank and feed system, flow controls and measuring devices to determine performance. Testing of major components of the engine has begun and the status of the test program is as follows:

- a) Arc thruster - Recently ran continuously for 27 hours at 1100 sec specific impulse on 1.1 KW with hydrogen propellant.
- b) Power Supply - Bench testing has just started on the pulsed DC units.
- c) Feed System - First cold flow tests have been made from supercritical storage to check functioning components. Test considered satisfactory.
- d) Starter - Bench tests on contact starter are being made.

The first complete mock-up of the engine has been sent to MSFC; it will be shown at the ARS Space Flight Report to the Nation. This is one of the four electric engines scheduled to be flight tested in late 1962 on SCOUT vehicles.

4. I had long discussions with Messrs. Dixon, Rosen, Abbott, and Mitchell in NASA Headquarters, where I was told that Hq. has decided to assign the electric propulsion program to the Office of Research and Advanced Technologies under Mr. Abbott. Responsibility for the execution of the program, or at least of its research and development portion, will be assigned to the Lewis Research Center. Details of the new organization are not yet firm. I requested Mr. Dixon to wait with further organizational actions until the new situation has been discussed at MSFC. Mr. Dixon complied with this request.

Buddie,

See Bonnie for action on one

Jan 10-18

West with Holmes, Dixon, Seamus, Abbott, Newell

OCTOBER 16, 1961

October 16, 1961

HIGHLIGHT NOTES FOR DR. VON BRAUN

FROM Office of Deputy Director for Administration

1. Labor Problem at the Cape - Mr. Styles has written a memo which states that the construction unions at the Cape have complained that we are not living up to our end of the agreement with respect to Complex 37. A meeting has been set for Nov. 7 to discuss this problem with the unions.

2. As a result of a technical note published by us, Dr. Seamans has asked for a firsthand look at how we control our technical publications with respect to content and security. He is considering withdrawal of our authority to issue technical publications from Marshall. Apparently, we abstracted from Missiles and Rockets magazine some data which the Air Force has classified secret.

3. Mr. Webb has approved our recommendations for the location of the static test site on the Gulf of Mexico. He plans to announce this location publicly on October 19. We are working with the Corps of Engineers to establish the exact boundaries and to file a claim in the courts prior to the 19th.

NOTES 10-16-61 CONSTAN

B10-17

1. ORGANIZATION AND STAFFING - MICHLOUD

Many inquiries and letters are being received, but to date, the quality of applicants has been disappointing. Of some 55 - 60 people interviewed, only four have been selected for definite appointment:

Mr. H. B. Abernethy, Ass't for Admin, formerly ABMA Industrial Div.
 Mr. Elbert Martin, Ch, Contract Adm. Ofc., formerly MSFC P&C
 Mr. James J. Peek, Security Specialist, formerly MSFC Security
 Mr. Robert Delaney, Property Administrator, presently with Birmingham Ordnance District at Michoud

Some job offers have been declined. Few nominations have been received from the division and staff offices. It may become necessary to advertise some of the key positions.

Operations Analysis is assisting with screening applicants, preparation of organization and staffing plans, working with Personnel Office on job sheets and grades, and helping with the other initial paper work. ✓

2. CONTRACTS & SCHEDULING

a. Housekeeping Contract: Requests for quotation expected to go to 24 prospective bidders by October 20, with return date 15 days later. ✓

b. Renovation Contract: Requests for quotation were sent out September 22 with return date of September 26. Award was made October 10 to Curtler-Hebert Co., of New Orleans - \$666,471. Work to begin immediately. ✓

c. S-1 Contract: Requests for quotation sent out September 18th. Proposals due in October 16th. Selection to be announced November 15th. ✓

d. S-1B Contract: Requests for quotation sent out October 6. Proposals are due in November 8. Estimate announcement of selection about December 15th. ✓

3. TEMPORARY MICHLOUD OFFICE LOCATION

In about 10 days, Michoud Office will be established in Twickenham in space being made available by Mr. Davis. Additional temporary space may be available there later if needed. ✓

NOTES 10-16-61 GRAU

B10-17

1. Chance-Vought Container Contract: Arrangements have been completed for a Quality Division representative at C-V. Meetings are in progress to clarify inspection coverage by the Navy. The proposed inspection coverage is inadequate and not in accord with Quality Division - Navy understanding prior to start of work. ✓
2. Saturn GSE Contract NAS8-2483 LOD (Poppel) \$3.129M: Hayes Aircraft contract delegates authority for final acceptance of hardware specifically to Quality Division. Air Force will perform inprocess and final inspection, but individual task orders may redirect the inspection and acceptance function upon request of the Quality Division. This is the first time that a contract provides for direction by the Quality Division and - as expected - the Air Force already voices objection to several requirements. A meeting has been scheduled for resolution of the problem. This will be an interesting test case which might have some influence on the future attitude of the AF. ✓
3. School for Reliable Electrical Connections: Retired Air Force Col. Edwin Lee White and his wife have received instructor certificates from our Quality Division school. They will return to St. Petersburg, Florida, to teach the handicapped at the new Abilities Inc. Plant. ✓
4. P&W Aircraft coverage by Quality Division: Per your request for comments concerning NOTES 9-29-61 (copy attached), the reduction in the number of personnel stationed at P&W Aircraft was primarily a result of your decision to allow P&W development people as much freedom as they needed to deliver the first 6 or 8 engines. This decision reduced the authority and effectiveness of the Quality Division personnel and a large group on TDY was not needed. The P&W development engineers have the authority to override Q.C. decisions and assembly takes place without inspection coverage. A second factor affecting the reduction in effort at P&W was that the final acceptance and buy off responsibility was delegated to the Air Force by the Propulsion Projects Office. The third and deciding factor was the withdrawal of TDY funding support by L&MVO and Propulsion Projects Office. Quality Division TDY funds could not support this effort.

Dieter Graue

These notes will be held in suspense, when reply is ready, please send to Dr. McCall w/cy of these NOTES as reference.

Do you think the time has come to tighten up again? P&W told us at that time they could keep the new schedule only if we'd "call off our dogs for awhile". Please B10-17 prepare joint reply & recommendation with Lee Bekw.

NOTES 9-29-61 QUALITY

1. SA-1 and SA-2 Command Systems: Electrical inspector will cover replacement of blackballed "TRANSITRON" transistors at Motorola.
2. Contract Review: 313 contracts covering space vehicle FLIGHT material (dollar value of 1.5M) reviewed between August 7th and September 1st.
- 243 - did not have inspection clause.
 - 308 - did not specify source inspection.
 - 292 - did not specify point of acceptance.
 - 307 - did not specify responsibility for making acceptance at MSFC.
 - Only 17 - contained a delayed (30 day or less) inspection clause.
- The above stresses that procurement review is vital and should be made mandatory.
3. Automatic Checkout System: Design documentation has been received from Packard-Bell and is undergoing evaluation. Early delivery items were put into use for SA-2 pre-static checkout.
4. Saturn Pressure Functional Test Equipment: Bldg. 4708, pressure cell equipment furnished by Lockheed, has been installed, verified and accepted. This gives Quality Division capability of checking two Saturn S-1 stages simultaneously.
5. Douglas - Santa Monica: A Quality representative has been stationed in the resident project office in support of the S-IV effort. A second Quality representative will join the first late in October.
6. RL-10 Program: Present level of effort at P&WA is down to one man. *"Isnt that critical? Comments, please!"*
7. Hydrostatic Test Tower: Preliminary plans, developed in cooperation with F&AE Division, have been submitted to OTS.
8. West Extension to Quality Division: Excavation of full basement is 80% complete. Completion date is September 5, 1962.
9. Receiving Inspection: Room in Bldg. 4471 is 80% complete. Quality Division should take occupancy in November which will give MSFC closer control over incoming material.

NOTES 10-14-61 HAEUSSERMAN

B 10-17

1. SA-1:

a. SA-D Tests: Evaluation of tests conducted during the last few days has confirmed earlier prognosis regarding excessive G&C canister motion. Details of findings and recommended remedial actions will be presented October 16. ✓

b. Personnel at Cape: Nine persons are presently at Cape. Eleven more are scheduled to depart during week of October 16. Their actual departure will depend on decision reached following 1a meeting. ✓

2. Close Out of ST-130: M-H, St. Petersburg, will visit G&C Wednesday, Oct. 18, to discuss details and procedure on close out of the ST-130. We will get the component hardware which can partially be used for CENTAUR and the three 8001 gyros will be very welcomed for our familiarization with floated gyros. We assume (and will arrange with Mr. Hueter) that the CENTAUR Project will now supply the total funds for our floated gyro laboratory facility. ✓

3. Spacecraft Guidance System Development: We are keeping in contact with MIT until a more formal arrangement is worked out. The development is still in a study stage at this time. Our representative at ARS meeting gave short description of ST-124 system with some performance data and assembly drawings to Dr. Milton B. Trageser. He, with some of his engineers will visit G&C in about four weeks. ✓

4. ARS Meeting in New York: We had only one attendee due to work load commitments and shortage of travel funds. His observation was that it was an excellent program having many fine high level sessions. Regrettably, G&C was quite conspicuous by its absence in the presentation of papers. This situation can only be attributed to the pressure of work load during the year. ✓

5. S-11 Meetings held in G&C with NAA Representatives: October 11th G&C Systems. October 12th Vehicle Instrumentation Working Group. This was a very successful general information type meeting. ✓

6. Automation Working Group Meeting: Ninth meeting of group held October 13th attended by representatives from four G&C Branches. Items Covered: Utilization of PCM TM system for SA-5 as related to automation requirements; SA-5 measuring program, types of displays suitable for block house automation equipment; grounding and signal isolation problems associated with automation program. ✓

7. Transitron Transistors: During recent weeks Transitron representative has assisted G&C in evaluating affected transistors. Current parts inventory of G&C indicates affected transistors are used in 24 cases in vehicle equipment and 55 cases in ground support equipment. All design engineers have been informed of this reliability hazard and are required to report back their remedial action. All affected transistors have been "pulled" from supply sub-store and laboratory areas for thorough inspection by Quality Division. ✓

NOTES-10-16-61-HEIMBURG

1. SA-2. First static firing successfully conducted on October 10, 1961. Preliminary evaluation of results indicates no trouble area or malfunctions. Second static firing is scheduled for October 26, 1961, 10 a.m. (for VIP's). ✓

2. West Area Static Test Stand. Write-up on sound conditions for West Area and C-4 sent to NASA Headquarters; one copy to Lt. Col. S. C. Berry and one copy to Mr. R. B. Canright. No further word has been received from Headquarters on go-ahead with construction. ✓

B10 -17

NOTES 10-16-61 HOELZER

1. SATURN EVALUATION ROOM: The rooms designed and equipped for the Saturn Evaluation Group are under construction and should be finished by late next month. These rooms are located above the connecting wing between the north and center wings of 4663. In the meantime, Dr. Speer's group will use our conference room. ✓
2. LOD SUPPORT: We are installing a small computer, IBM 1401 system, at the Cape early next month to handle LOD's ADPS activities. We have 1 Civil Service man and 4 GE people down there now working with LOD people to set this up. We will probably have 10 or 11 people there permanently to support this operation. This will be a separate group from the one supporting Dr. Bruns with the Burroughs computer. ✓
3. AEROBALLISTICS ANALOGUE COMPUTER: Next month we are installing \$168,300 worth of high speed, repetitive analogue equipment in 4484 (Aeroballistics Division) primarily for the study of the effects of wind gusts on vehicles. Three Computation Division people will be assigned to operate and maintain this equipment. ✓
4. MICROSADIC USED ON SA-2 TEST: Using our new Microsadic digitizer, we digitized one link of telemetry from the SA-2 static test last Tuesday in real time. The data were completely reduced 30 minutes after the test was completed. ✓
5. PERT: Unfortunately, we are losing our key PERT person, Mr. Herbert Parker, to the Army. The existing computer programs will continue to run, but further contributions of any significance from us will have to wait until we can find and train another man for this job. ✓
6. NEW GE MANAGER: As you may recall, Mr. Brock left us some time ago for another job in GE. We now have aboard his permanent replacement, Mr. Robert Baker. Mr. Baker seems to be competent and promises us his fullest cooperation. He apparently has the confidence of his immediate superior in GE, Dr. Sassenfeld. ✓

→ Helmut

Please answer
on 10-23 NOTES

Has he been proselyted
against NASA - Army
agreement?

B10-17

NOTES 10-16-61 Koelle

1. LLVPG SUPPORT - Discussions were held with Thiokol, Aerojet, and United Technology Corporation to gain information pertaining to past and proposed solid development programs. All data are being evaluated to assist the LLVPG in defining realistic schedules and reliabilities. Primary question asked by LLVPG is what is the schedule difference between the 160" and 240" motor development. ✓

2. LLVPG THINKING - Emphasis is being placed on a 240" solid motor for C-1, C-4, and possibly NOVA application. The solid propellant enthusiasts are pushing for a solid vehicle back-up to the liquid C-4. This week the funding picture will be studied in detail, since the worst solution would be two underfunded programs.

→ Couldn't agree more!

B

10-17

NOTES - 10/16/61 - KUERS

B10-17

SA-1 - Installation of modified outboard engine curtains eliminated interference with gimbaling action. ✓

SA-5 - Tool design for tail and spider sections well underway. ✓

Assembly Working Group - Ad hoc committee on S-II stage held initial meeting at MSFC. Discussion centered on welding technology, particularly in connection with NAA's "skate" tooling concept and its application on aluminum alloys. ✓

Saturn C-4 Project - Program for in-house participation developed and is being coordinated with other divisions. ✓

R&D - Developed new weld arc guidance system which is sensed to eddy currents induced by two coils on 60-cycle instead of high frequency current. This method far superior to any system commercially available. ✓

Facilities - Additional justification for new hydrostatic test tower, necessary for either C-3 or C-4 program, submitted to NASA headquarters for approval of project and inclusion in revised FY-62 budget. ✓

NOTES 10-16-61 Lange

I. Block II Dynamic Testing - The plan for hardware allocation, to be officially published later this week, looks like this.

A. S-I Stage

1. An additional S-I stage will be put in the MSFC schedule following SA-7. ✓

2. SA-5 to SA-10 will be design released as a block. ✓

B. S-IV Stage

1. The Dynamics test stage, as planned, will be shipped to MSFC in September, 1962. ✓

C. Plans

Condition 1 - SA-5 is flown "live", meaning a two month delay in the launch schedule, then...

(a) The presently scheduled SA-6 S-I stage will be re-allocated to Dynamics Testing. No slippage of vehicles beyond SA-5 would occur due to this. ✓
Dynamic testing would start in September, 1962. Decision must be made by March, 1962.

(b) SA-DI or SAT-1 booster plus the S-IV dynamic test stage would be shipped to AMR in January 1962 for propellant loading tests on VLF-37. ✓

Condition 2 - SA-5 is flown without S-IV stage engines in its present schedule, then...

(a) The added S-I stage will be allocated to Dynamic Test. ✓
Testing to start December 1962.

(b) The S-IV stage for SA-5 would be shipped to AMR in January-February 1963, to be used first for propellant loading tests. ✓

(c) The S-IV dynamic test stage would remain at Huntsville. ✓

II. DAC Effort

Design effort on the C-133 transportation scheme for S-IV is no longer progressing. Langley Center doubts the C-133 feasibility as DAC outlined it, and H.Q. wants to study the feasibility of blimp usage. Meetings were conducted at MSFC on S-IVB and on propellant loading and sequencing. About fifteen DAC attended the MSFC briefing on guidelines for S-IVB design. Clarification of umbilical tower and vehicle interfaces were resolved. DAC is figuring the DYNA SOAR effort costs and closing costs. ✓

B10-17

NOTES: 10-16-61 MRAZEK

1. RIFT: (Reference Action, Note 3 on Attachment No. 1.) Continuous telephone prodding from Scott Fellows' office to OLVP since the Program Review, September 12, 1961 yielded nothing until October 13, 1961. As of that date, Mr. Rosen stated that he has asked Harry Finger to talk to Mr. Dixon on Monday October 16, 1961 regarding this MSFC fund request. Fellows' office has compiled a package of action items which have been generated by MSFC regarding the request for conceptual design funds. (This is available if you require it.) ✓
2. RIFT: The RIFT Procurement Plan has been approved by the Business and Legal portions of NASA Headquarters and by Mr. Finger. As of October 13, 1961, the Plan was on its way to the Administrator, through the Business Office, for final Headquarters approval. ✓
3. S-IV-B: A set of preliminary criteria for the S-IV-B has been prepared and given to Douglas Aircraft Company. ✓
4. F-1 ENGINE FACILITIES: Funding has still not been made available by NASA Headquarters. This delay in receipt of a fund allotment will result in a comparable delay in acceptance testing of production engines. ✓
5. A-1 ENGINE: Delivery of one engine for PFRT and two CENTAUR PTV engines is still expected in October, 1961. ✓
6. A-1 ENGINE: (Reference Note 4 on Attachment No. 2.) Convair/Astronautics has not yet commented on the deviations herein noted. These comments were expected last Thursday. ✓
7. J-2 ENGINE: Facilities funding to support the "Deepened" R&D Program has not been released by NASA Headquarters. This may result in a delay of the scheduled PFRT program. ✓
8. M-1 (Y-1) ENGINE: H. K. Weidner has been named chairman of the Source Evaluation Board and H. G. Paul has been named chairman of the Technical Evaluation Committee. S&M preparations for the M-1 REQ are complete. As of this date Dr. Seamans has not approved the procurement plan. This Division has requested that OTS obtain some physical space for the evaluation of proposals. This area will be required in approximately 4 weeks and for a period of 14 to 18 days. No S&M facilities are available.

Attachments: No. 1 Notes 10-2-61 Mrazek
 No. 2 Notes 10-9-61 Mrazek

→ I do.

B10-17

Agreed to
 Mueller 10/19/61
 for Comments
 PGM

→ I understand
 this hurts Centaur
 performance even
 more. What are
 Huey's comments?
 B

NOTES 10-2-61 MRAZEK

✓ 1. RIFT: "Mid-Term Reviews" were completed this past week. Presentations by Lockheed, Martin, General Dynamics/Astronautics and Douglas on preliminary study contracts involved individual contractor's study efforts, and program summaries. Each MSFC Division was represented.

✓ 2. RIFT: Jack Froelich, Space General Corp. (SGC), announced desire to compete on RIFT vehicle. Aerojet General Corp. (AGC) has NERVA engine development but W. Zisch, Executive VP, wrote letter to Scott Fellows stating that there would be no interchange of RIFT/NERVA information between AGC and SGC. (Who believes that?)

✓ 3. RIFT: From all appearances, the critical item in the RIFT program is facilities. MSFC needs Hdq. approval to go ahead on conceptual design of vehicle test facilities in Nevada. Also needed is approval on RIFT Contractor Selection Procurement Plan. *↳ Scott Fellows:*

✓ 4. TURBINE SPINNER (H-1): Turbine Spinner started operating in single engine testing during final checkout. Fortunately propellant pre-valves were still closed. Investigations are proceeding to determine cause. *What have we done to get it? thermo sent to Col. Fellows 10/19/61*

✓ 5. MARK 3J TURBOPUMP: Released for SA-7.

✓ 6. SA-1 FLIGHT CURTAINS: First flight-type curtain is being tested in Structures Lab. (This is first one made since it was found that curtains originally delivered to Cape did not fit.) Five new flight type curtains to be delivered to Cape on/about Oct. 1. Spares to be delivered to Cape on/about Oct. 11. It was proposed that the first five revised version engine curtains for SA-1 be fitted at the Cape on the evening of Monday, September 25, 1961; however, this could not be done since it would have involved the chartering of a commercial aircraft (from Arrowhead to the Cape) at a cost of \$20,000. I disapproved this. (The normal airfreight does not fly on Saturday night unless it has a full load. It did not have a load and would thereby require a special charter.)

✓ 7. FLEXIBLE CURTAIN MATERIALS PROGRAM: Contract with Goodyear Aircraft Co. to be in effect within 10 days. Level of effort \$120,000 /yr. This includes money recovered from cancelled Paraglider materials study. (Also with GAC)

✓ 8. Y-1 (1000K O₂H₂ ENGINE): Program go-ahead received from NASA Hdq.

✓ 9. ENGINE CONSULTATIONS: Pratt & Whitney were here on a technical review with Douglas and Convair. Cold flow tests of two engines on the vertical test stand were started.

NOTES 10-9-61 MRAZEK

1. Heat Protection on SA-2 and Subsequent: Beginning with SA-2 there will be selective replacement of X-258 covered areas with asbestos and reflective tape (examples: access chute, cantilever shrouds). A considerable weight saving is expected.
2. Pressure Decay Problems: Studies are continuing to develop a simple means to eliminate pressure decays (due to recondensation) in vehicle tanks with small ullages, as in SA-5.
3. Hardware Qualification for SA-1: All propulsion and mechanical hardware qualification for SA-1 will be completed by the end of this week.
4. A-1 Engine: Pratt and Whitney has finally gone on record stating that the A-1 engine will not meet the specification requirements in these and other areas:

	<u>Available</u>	<u>Specification</u>
a. Overshoot	approx. 20%	10%
b. Cutoff Impulse Variation	500 lb-sec	140 lb-sec
c. Engine Weight	up 20 lb.	-
d. Cool-down Valve Leakage	15 lb/min	2 lb/min

These facts must hurt the Centaur very seriously. Convair/Astronautics comments expected by Thursday. No remedial action in sight on the part of Pratt and Whitney in the foreseeable future.

5. Vehicle Growth Potential Study for Golovin Committee: The Future Projects Design Branch of S&M Division is currently investigating the use of the C-4 vehicle for NOVA payloads under two conditions:

- a. 'C-4 - Nuclear
- b. C-4 with ten 156-inch diameter solid motors wrapped around the S-I-C booster. This requires an air start of the F-1 Engine.

6. Reliability Program: Due to very significant fund reductions in FY-62, the reliability program on Saturn C-1 components has been greatly reduced. In order to accomplish the reliability testing on all Category I items (items in which failure would cause loss of vehicle) during FY-62, this Division requires 5.58 million dollars. The total funds available are 1.417 million dollars.

NOTES 10-16-61 STUHLINGER

1. ARS Meeting: I spent the entire week at the ARS SFRN meeting in New York. The following papers were presented by RPD members:

- I. Dalins "Basic Data on Surface Ionization and the Implications for Ion Generation in Cesium Ion Rockets"
- J. W. Keller "Uncertainties in Space Radiation Shielding Calculation"
- E. Stuhlinger, Moderator of "Electric Propulsion" Panel, and of "Latest Events in Electric Propulsion" Panel.

Besides these two panels, six sessions with about thirty-five papers were devoted to electric propulsion. Significant progress was reported in all areas. The flight testing of engine models in late 1962 is approached with great confidence.

The news that MSFC's active role in the NASA Electric Propulsion Program will be discontinued spread like a mild shock wave among contractors and members of the Air Force.

2. Electric Propulsion Program: Contract actions are being expedited as rapidly as possible to prevent this program from dying of inaction following the transfer of contract activities to another agency. This week we sent seven procurement requests to P&C, committing an additional \$900,000, making a total of approximately \$5.000 million of FY 62 Electric Propulsion money committed against the \$6.151 million authorized.

3. RIFT Stage Testing Facilities at Nevada Test Site: RPD and Test Division representatives discussed ways in which RPD could support Test Division in designing the RIFT Testing Facilities. It was agreed that RPD would do in-house calculations on dose rates, hazards, shielding, analysis of reactor activation problems, and other nuclear engineering items as needed.

4. Dr. Harvey Hall: The experience of RPD in dealing with Dr. Harvey Hall on the Vehicle Systems Technology Program has produced a high regard for Dr. Hall and his abilities to execute the Headquarters part of such a program. If you have the opportunity to mention this to Mr. Holmes and to recommend Dr. Hall for a similar position in the Office of Manned Space Flight Programs, it would be beneficial to all concerned. I plan to send a letter to Mr. Holmes saying essentially this. Due to his full-time activities with the Golovin Committee, we have been unable to contact Dr. Hall to advise him of our proposed action. ACTION REQUIRED (IF THE OPPORTUNITY PRESENTS ITSELF)

5. Supporting Research: We began to study a possible separation of the MSFC Supporting Research Program into two parts: a) "Research Projects" of a more independent nature, to come under Mr. Abbott; and b) "Supporting Technology", related to the Manned Lunar Project, to come under Mr. Holmes. The latter program is the one referred to in paragraph 4.

6. Launch Vehicle Technology Program: Of the \$6.301 million authorized for the 1st and 2nd quarters, contract actions totaling \$2.048 have been sent to P&C. Divisions have been encouraged to accelerate contract requests to commit LVT money.

B 10-18

He has!
B

NOTES 10-16-61 DEBUS

1. VP Johnson's visit to PMR: An interesting story of deliberate tactics by Air Force individuals to take over tour from NASA. If Slattery has not already briefed you, I suggest that he does, or I do. A detailed report for the record was published by Burttschell which is also available.

2. VP Johnson's visit to AMR: Now set for October 26th. Luncheon at noon with AF/NASA personnel at the Officer's Club... then to NASA tour. I am extending invitation to Davis to accompany us on tour with Johnson. ✓

3. Selected list of VIP's of recent dates:

Groups:

NATO Journalists
British Interplanetary Society
Royal Canadian Air Force
Admiral Clark of PMR and Staff

Individuals:

Dr. Benecke - Dept Germany Ministry of Defense
Mr. Coyne - Presidential Advisory Board of Intelligence
Prof. Staats - Germany
Prof. Cooly - Netherlands
Prof. Cid - Portugal
Prof. Kosseda - Netherlands
Prof. Wauppermann - Germany
Prof. Bostaim - Sweden ✓

VIP's for Wednesday, October 18 - Florida - Senator Smathers and group of 50. ✓

Dr. von Braun:

These came in late. This time we are sending them in to you separately. In the future they will be included with the others even if one week late.

Jan 10-18

NOTES 10-17-61 DEBUS

1. Organizational Proposal: The proposal for a NASA central organization at AMR which I reviewed with you, was presented to Seamans, Holmes, Dixon, Phillips. It was well received, however, Seamans retained it for further study. I thought that we would have had an answer by now, but no word has been received. Dixon impressed me with his grasp of the situation. I had a short private discussion with him after the meeting. ✓
2. SATURN Structure Incident: Monday (this week) acceptance tests of the new hydraulic system were run on the structure of Complex 34. This was to make certain of operations involved with the hydraulic system which had to be replaced due to extremely sloppy workmanship on the original installation. However, because of SA-1 the structure could not be moved. Therefore, the traction drive coupling was disconnected at the reduction gear. When the structure was raised, the wind pressure started to move the structure...when the motion was noticed, a "chock" was put under wheels...total movement seven inches approximately. (Wind steady 15 knots, gusting to 22 knots) Inserts on structure platforms moved against SA-1, but no major force was applied directly to the bird, therefore, no damage, but event will be checked thru S&M. Full detailed account of operation available if desired. ✓ Huh!
3. Planned CENTAUR Operation: As opposed to AGENA Program, LOD is having a degree of success with applying LOD type operation to Convair checkout and launch procedures. Admittedly, however, I had to impress them strongly with the fact that we intended to operate with all contractors of SATURN this way. They understood. ✓
4. Operational Flight Control Studies: Proposals have been submitted and evaluation is now in progress for selection of a contractor. ✓
5. Acoustic Studies: Dr. Wiener of Bolt, Beranek and Newman explained their investigations to date. I asked for a Phase II proposal and cost estimate to continue this study of the SATURN acoustical problem. ✓
6. Problem: The funding and budget area for the Lunar Program at AMR continues to be a source of aggravation at AMR. It seems that certain Air Force personnel refuse to understand the control we will exercise for NASA; they want to obtain many facilities for AMR not directly, but by a stretch of the imagination could be connected to MLLP. We are continuing to work on it. ✓

10-23-61.



NOTES 10-23-61 CONSTAN

B10-23

PERSONNEL

The following additional personnel have been selected for the Michoud Operation:

Mr. James L. Stamy, Asst for Project Management, formerly with Light & Medium Vehicles Office, MSFC

Mr. Keith Wible, Executive Assistant, formerly Chief, Security Br., MSFC

Have meeting scheduled today with Mr. Grau to discuss appointment of Assistant for Quality and Inspection. ✓

RENOVATION OF FACILITY

Harry Gorman
Who will replace Keith in his former job? B

The contractor, Gurtler-Hebert Co. for Contract NAS8-534, began work on October 16, 1961. Using an average of 18 men, work for the past week includes:

- a. Fitting and checking window screens,
- b. Roofing of office building.
- c. Sand blasting stone front of the building, and
- d. Removal of lettering on front of building.

The contractor submitted mechanical and electric sub-contractors for approval on October 16th and this was forwarded the same date to Huntsville for Contracting Officer approval. ✓

HOUSEKEEPING CONTRACT

The requests for quotation are expected to go out today or tomorrow to 45 or more prospective bidders. Return date will be about 15 days from date of mailing, an award will be made some 15 days after receipt of proposals. ✓

S-1 CONTRACT

Seven proposals were received and are in evaluation process; anticipate meeting the contract date of November 15th. ✓

S-1B CONTRACT

Proposals are due in November 8th. Estimate announcement of selection about December 15th. ✓

NOTES - 10-23-61 - GEISSLER

B10-23

1. IN FLIGHT EXPLOSION HAZARDS: The 4th meeting on explosion hazard problems in flight was held on Oct. 16 & 17, with Combustion & Explosives Research, Inc. Representatives of M-S&M and M-L&M participated. While previous meetings dealt mainly with elimination of potential hazards in current vehicles, this one opened a new phase, where primary emphasis is placed on supporting research. The discussion covered blast from range-safety destruct, detonation in gaseous and solid phases of the $H_2-O_2-N_2$ system, blast waves at high altitudes, behavior of discharged cryogenics, pertinent fluid mechanics problems, etc. The RIFT operation and its potential hazards were also briefly discussed. ✓
2. C-3 & C-4 STATIC STABILITY INVESTIGATIONS: Static stability investigations were completed this week on C-3, C-4 configurations. Data includes primarily fin effects (20 configurations) and engine shroud effects on stability. Design of C-1 successor will rely on these data for early optimization of design. ✓
3. FLIGHT INSTRUMENTATION SECTION MISSION: The former Flight Instrumentation Section has been reoriented to include a broader scope of work which will include low density aerodynamics and problems of a more thermodynamic nature. The Aeroballistics High Vacuum Facility, an approved FY-62 facility, will be transferred to Test Division for operation, with this Division utilizing approximately 30% of the available time. Propulsion problems at high altitudes, (i.e., base heating, jet spreading, etc.) will be handled by this section in the High Vacuum Facility. The angle of attack work will still be a responsibility of this group, but flight hardware is being cared for by G&C Division. ✓
4. HIGH ALTITUDE DENSITY MEASURING PROGRAM: An evaluation program for high altitude density measuring equipment and techniques is being established for supporting M-AERO-G. This will include calibration of duplicate hardware and advice on proper aerodynamic installation and flight data interpretation. ✓

B 10-23

NOTES 10-23-61 GRAU

1. AIR FORCE QUALITY CONTROL Through a channel which I would not like to disclose, I received a copy of a letter from Headquarters, Air Force Systems Command, Washington, dated 20 September 1961, Subject: Support of NASA, signed by General Schriever, and distributed among others to the different Contract Management Regions. The most important statements of this letter are quoted:

"a. We will do everything possible by working with top level people in NASA to gain acceptance of our normal contract administration.

b. When there is truly unusual and special support required we will attempt to provide it.

c. When the unusual support requires extensive manpower resources and operation funding, it should be obtained from NASA.

d. We should strive to make our contract administration and support complete enough and fully responsive to NASA to preclude duplication and conflict.

e. Where NASA considers that they need some of their own people on a temporary basis resident in plants where the Air Force has plant cognizance and contract administrative staff, or other program management offices, this may be permitted on a temporary basis in consonance with negotiations conducted at the local level."

I have made NASA Headquarters, Dr. Gephart's office, aware of this letter which indicates some softening of the Air Force attitude. It appears that the reasonable and firm attitude of this Center and NASA Headquarters begins to pay off.

2. S-II STAGE DISCUSSIONS Mr. W. F. Parker, Vice President and S-II Program Manager, NAA and associates were visitors at Quality Division October 19, 1961. A full day of detailed discussions were very fruitful.

Mr Reese
Mr Gorman
Mr Davis
for info.

↓
Davis
for action
to suggest
he invite
trans also
JPM 10-24

by sent to
Davis 10/24/61

NOTES 10-7-61 HAEUSSERMANN

B10-23

1. SA-1: Following 10-21 decision arrangements were made for ten persons to return to Cape via charter plane 10-22 p.m. (Sunday). Ten more will depart during week of 10-23. With the five presently there we will have a total of 25 plus four observers. Key personnel included: Haeussermann, Hoberg, Fichtner, Moore, & Brandner. ✓

2. Direct Communications to Cape: Arrangements have been made for extension of direct line (presently terminating in M-DIR Conference Room) to be in service in G&C Conference Room in time for SA-1 launch. ✓

3. Close Out of ST-130 and Benefits for Centaur: Meeting was held in Kroeger's office 10-18 and attended by four representatives from M-H, St. Petersburg and four from G&C. It was felt by both parties that initiation of the ST-130 Contract resulted from the activities of the Buchheim Committee and not because of recommendations of either M-H or G&C. The M-H efforts to date have been covered by incremental funding. Current balance of funds is not significant considering work in process and commitments outstanding. Therefore, it is G&C's intention to re-direct scope of work to make effective use of funds remaining. Example: Digital coupler redesign ----- separating power supply and repackaging pulse rebalance. Resulting improvements in performance and reliability would benefit the CENTAUR system. M-H to organize phase out and advise Kroeger on 10-25. Our position regarding CENTAUR will be clarified with L&M Office and Convair within the next few weeks. This will include M-H proposals, i.e. environmental and centrifuge testing of platform components, azimuth reorientation, etc. M-H also proposed to furnish a SAINT type computer for evaluation by G&C for possible backup in MSFC programs. This could not be considered because a requirement did not exist. ✓

4. G&C Cryogenic R&D Activities: Presently, G&C (with funding support from Navy) has a cryogenic R&D contract with G.E. (Buchhold). The AF, G&C Lab., Wright Field holds a separate contract with G.E. We have invited Mr. Robert Doran, Civilian Chief of the Labs, and some of his people to visit us on 11-8 to discuss possibilities of combining efforts in the cryogenics field as well as other work in general field of G&C. ✓

5. Expansion of Facilities: Approval of change in scope for our C-Wing extension was received 10-16. Invitations to Bid expected to be issued by P&C about 11-1. Flotation gyro lab. facility A-E contract has been finalized. Meeting with Hueter regarding CENTAUR funding total project will be held during week of 10-23. ✓

5. Travel Funds: Allocation for first half of FY 62 was \$84,700. Bal. 10-20 \$28,500. Monthly going rate approximately \$15,000. for most essential requirements only. This is expected to pick up due to new \$16,00 P.D. plus recent decisions regarding ST-124, S-II MICHOUDE etc. Estimate zero balance by 12-10.

Ted Hardeman

Is this situation alleviated by the new S&E allotment?
(4.6 M) B

By Sent to Hardeman 10/24/61

P&C
How did
you make
out with
Harvey Hall?
B

NOTES 10-23-61 Helmburg

B 10-23

1. BARGE MODIFICATIONS: Contract was let to Todd Shipyard in the amount of \$127,000.00 for modification of "Barge Compromise". Major improvement will be the cover over deck area and new ballast system. There will also be numerous small modifications. Barge will leave the Cape for Houston, Texas, October 26, 1961. ✓

2. SA-2: SA-2 acceptance (duration) firing is planned for Tuesday or Wednesday. Three rate gyros have been installed on the fin IV beam of the upper spider to determine suitability of this environment for mounting. ✓

3. NATIONAL TEST SITE:

a. T. E. Edwards and Dr. W. H. Sieber made final presentation in Washington, October 19, 1961, on National Test Site. Dr. Sieber made sound presentation. He was questioned quite thoroughly. One question was, "What Effect would the Firing have on Funeral Procession?"

→ guess a feller can't be deader than dead!

b. Arrangements were finalized with NASA-Washington, O.C.E. and Department of Justice for simultaneous press release, court action, and information to Congress as to the selection of National Test Site. Release is scheduled for October 25, 1961. ✓

4. WEST AREA DEFLECTOR: Started series of model tests of the West Area deflector, using C-4 configuration with 1/66-scale model engines. ✓

5. VLF-37: Continuing 1/20-scale (VLF-37) simulated launch tests with cooled deflector. Presently studying thermal coatings and backwash generated by closer proximity of deflector and engine nozzles. ✓

6. WEST AREA STATIC TEST STAND: Approval was received for the redesign of the West Area Stand to C-4 configuration requirements. The A-E was already at work on the new concept and field work will be resumed in two to three weeks. ✓

7. J-2 TEST FACILITY: Preliminary design criteria for the Liquid Hydrogen, LOX Storage, and Blockhouse Expansion is 97% complete. P&C should negotiate this week with Bechtel Corporation for design of the facilities as set forth in Volume One of the criteria. This design will be negotiated as a modification of the existing NAS8-2409 contract for preliminary design criteria. ✓

Mr. Helmburg
Please send me pictures of these tests.
B
request more detailed briefing B

NOTES 10-23-61 HOELZER

B₄-23

1. PERT: You asked if Mr. Parker had been proselyted against NASA agreement. No, he was not. Everything was open and above board. ✓
2. ENGINEERING DRAWING SYSTEM: A consultant from Convair has completed a 30 day study of the MSFC efforts to mechanize the engineering drawing system. His report on this study, including his recommendations, will be furnished to both S&M and Computation Divisions. More on this after I have seen the report. ✓
3. THERMO-CHEMICAL DATA FILE: We have prepared a computer file of 22,000 records of thermo-chemical data for use by S&M Division in fuel studies. This file will be maintained and updated from Air Force and Army data which will be submitted to us. These data will be available to all elements of MSFC who have a need for them. ✓
Hoelzer
Good idea, it as a matter of general interest.
4. AUTOMATICALLY PROGRAMMED TOOLS: The APT System has been used on the Computation Division's 7090 computers to program about 20 parts for the Burgmaster Numerically Controlled Drilling Machine in the Fabrication and Assembly Engineering Division. Operating procedures are being developed to coordinate the efforts of F&AE and the Computation Division in the production of tapes for new parts. ✓
Hoelzer
initiated this? Has to be yet similar actions on other good ideas which might escape his attention?
5. ANALOGUE COMPUTER WORKLOAD: Several large problems in the SATURN program from Aeroballistics and S&M Divisions in the areas of fuel, temperature, and engine studies are being delayed for lack of large analogue computer capacity, and it looks very much as though we may have to buy another system similar to our Electronic Associates 231-B computer. This will cost about \$200,000. However, before I say definitely that we need this additional equipment I will look into the existing workload of smaller problems that are tying up our other analogue computers. In general there seems to be an increasing demand for analogue computing both on a centralized and decentralized basis. We have placed several small analogue computers out in the other divisions. The reception of these computers on a decentralized basis has been most enthusiastic. ✓
B
6. ARMY SUPPORT: The Army seems to be making rapid progress in obtaining their own capability. They plan to install a 7090 computer in January in a temporary location. We will be able to use this computer and can save some S&E money by shifting some of our work to the Army computer and paying for it out of Support of Plant money. I will give you dollar figures on such a plan next week. ✓

→ and Ted Hardman!

23 plane
 Maintenance & Repair
 NOTES 10-20-61 Koelle
 B4-23

1. ORBITAL OPERATIONS REPAIR STUDY - MSFC/STG COORDINATION

Jim Carter, M-FFQ, and John Woller, M-F&AE, visited the STG on October 16, 1961 to coordinate preliminary plans for developing the M&R criteria to be incorporated into STG's space suit development program. A preliminary exercise was determined necessary and the following schedule planned.

- a. Visit of STG Project Engineer, John Leshko - November 6, 1961
- b. Planning and Organization - November 13-25, 1961
- c. First Tests on F&AE Division - November 27-30, 1961
- d. Preparation of Final Plan - December 18-22, 1961

After preparation of the final plan, more detailed tests will start in mid January or February 1962, pending receipt of new pressure suits. ✓

2. ORBITAL OPERATIONS REPAIR STUDY - MSFC IN-HOUSE EFFORT

A working group headed by Jim Carter and composed of members from LOD (Demster), TEST (Moore), F&AE (Woller), and QUALITY (Buchmann) has been organized to prepare initial plans and procedures for the MSFC in-house effort. A malfunction analysis is underway to collect malfunction data on Mercury-Redstone, Jupiter, and Saturn through existing computer programs from the Quality division. This analysis will provide tasks that will be used to establish the M&R tasks for the preliminary exercise during November 27-30, 1961 and later phases. Since this will require the efforts of at least two engineers - 50 to 75% of their time-for the next few months, efforts are being made to obtain a project engineer from F&AE and an assistant from QUALITY. F&AE will furnish mock-ups, facilities, and auxiliary equipment. ✓

3. LUNAR LANDING STAGE (Action Item)

Max Faget told me last Friday that they are now drafting the specs for the lunar landing stage. Should we not try to get in on it at this time? If the answer is yes, I suggest you call Mr. Gilruth and make proper arrangements. ✓

Source
 let me
 call
 Mr.
 Gilruth.
 let me also
 discuss this
 with Mr. Dixon
 Thursday. Please
 make note. B

NOTES - 10/23/61 - KUERS

*Please send up
an original and
2 copies -**B10-23*

- SA-2 Rate gyros attached to radial beams of second stage adapter for investigation of control problems encountered on SA-1. ✓
- SA-5 Anticipate about 3 weeks delay in start of assembly due to slowdown in the design and tool design areas of the tail section development. ✓
- R&D Presentation given by STL on relative technical and economic merits of horizontal and vertical assembly of 1st stage NOVA configuration. Methodology of analysis, however, is applicable to any size. Structural assembly by vertical method is more favorable both from technical and economical aspects. For final assembly no difference was noted between the two methods except when production rate goes up rapidly, then vertical assembly again is more favorable. ✓
- Facilities: Project for hydrostatic test tower approved by OLVP (Col. Berry) Washington, and was forwarded to Dr. Seamans for approval. ✓

↓
Please keep me posted on this
B

NOTES 10-23-61 Lange

B 10-23

I. S-II CONTRACTUAL ACTION - Reasons for delaying the firm contract and signing an engineering services contract are:

1. NAA required funding was 36.000 million versus 25.000 million available. ✓
2. To gain a more definitive scope of work by allowing MSFC and NAA engineers to work together for 90 days. Open areas include:

- a. Diameter
- b. Electrical networks
- c. Control system

3. NAA proposed schedule was 4 months ahead of our present C-3 or C-4 schedules. ✓

→ Also: they projected layout for Seal Beads looks very plush to me. (See model in FREE modeling shop and discuss matter with Kuers!) B

II. C-133 AIR TRANSPORT FOR S-IV STAGE - On the basis of Langley investigation, Seasmans has said no. *How's the blimp plan coming along?* ✓

III. PERT - The S-I personnel of this office have been meeting with TPC personnel in preparation of using the PERT programs developed by TPC for the S-I SA-5 as a firm management tool. This present network indicates the stage is 18 months off schedule; our first work will be to try to work this time out of the program.

IV. AUTOMATION: - We are reviewing with the divisions the funding required to institute the "automation" plan in the C-1 vehicle. It appears that some serious funding shortages exist. The review will be complete in about 10 days and will be presented to the Automation Board of Mr. Fichtner. ✓

V. C-3/C-4 DIAMETER - Garright has seen some MSFC drawings indicating a 396" diameter. He asked if this were a firm MSFC position and asked if we were designing with 396". Told him we thought seriously of the 396" diameter; that a meeting would be held this Tuesday at which time our review of C-3/C-4 would take place. He evidently feels we should present the 396" to Headquarters. ✓

VI. RELIABILITY PROGRAM - We are working with M-REL in order to come up with a "new" reliability program for the SA-5 type vehicle by 12/1/61. It is probable that we will have to request NASA for supplemental funds to do this program. *yes, definitely.*

→ I am interested in results. B

WHAT??
B

Dr. von Braun:
I remind you, we just lost our PERT man to Army from Comp Div. If this PERT information is really useful, this loss is quite serious. 9/24/61-24
(Request more info + soon! This delay should be a catastrophe!!)

NOTES: 10-23-61 MRAZEK

B10-23

1. HARDWARE QUALIFICATION FOR SA-1: (Reference Action, Note 3, on Attachment No. 1) A briefing on the qualification test program has been set for 1:45 p.m. on Monday, 10-23-61 in your office. ✓

2. RIFT: (Reference Action, Note 1, on Attachment No. 2) Your request for review of action items regarding conceptual design funds for RIFT are being forwarded under separate cover. ✓

3. M-1 (Y-1) ENGINE: Further action has been delayed by approximately 30 days. This information from Del Tishler on 10-19-61, appears to have something to do with reorganization, 11-1-61. Good!! We've got enough more urgent problems.

4. J-2 AND F-1 FACILITIES: Funds have still not been released as of this date. Please keep me posted. I made a lot of steam on F-1 facilities with Dixon. B

5. J-2 ENGINE: Initiation of Engine Systems testing has been rescheduled for 2-5-62, a delay of six weeks. This is another admittance by Rocketdyne that the program is marginal and optimistic. ✓

Attachments: No. 1 Notes 10-9-61 Mrazek
No. 2 Notes 10-16-61 Mrazek

NOTES 10-23-61 SMITH

Bu-23

REPORTING

This office is attempting to get their branches organized in such a manner that they will submit weekly reports to the office of the Chief. Should have a report of significant happenings in this area by next week.

Has do we present duplication
of effort? Has about these notes
to me? B ✓

Dr. von Braun:

The reporting effort Mr. Smith
refer to is specifically for the
preparation of these NOTES to you.
It is not in addition to these NOTES,
so no duplication of effort is created.

QCm10-24

NOTES 10-23-61 STUHLINGER

B10-23

1. SUPPORTING RESEARCH PROGRAM. In response to informal requests from persons in H.Q. working on the Launch Vehicle Technology Program, we divided our FY 1962 program into three categories:

- | | |
|----------------|-----------------|
| a.) Mr. Holmes | \$5.372 million |
| b.) Mr. Abbott | \$0.670 million |
| c.) Dr. Newell | \$0.450 million |

The balance of \$1.042 million has not yet been assigned to one of these categories.

Dr. Lundquist will handcarry this information to H.Q. today (Oct. 23) in order to discuss our proposals with members of the new offices. *Careful, careful*

2. NUCLEAR PHYSICS. Mr. Carl Schwenk of Mr. Finger's Office has asked W. Keller of RPD to technically supervise a proton shielding contract (\$105,000.00) with Oak Ridge National Laboratory. This will be the second contract he is supervising for Mr. Finger; the other contract is with General Dynamics at Ft. Worth. The new contract is complementary to an existing MSFC (RPD) experimental program at ORNL to determine cross sections of materials for fast proton beams. ✓

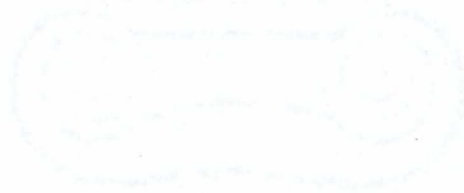
3. ELECTRIC PROPULSION. Thirty-three contract actions have been processed through Mr. Hardeman's Office since the beginning of FY 1962. This activity is causing a burden on P&C; we made arrangements to have Mr. Parsley from RPD work for a few weeks in the P&C Office to assist in the negotiation and finalization of contracts. ✓

I talked to Dr. Silverstein, Mr. Mitchell, and Mr. Finger in connection with the reorganization of the Electric Propulsion Program, while Mr. Thompson of RPD visited Dr. Harrison, Capt. Hayes, Dr. Schulman, Mr. Attinello, and others in NASA H.Q. to discuss the same matter. No plans for the new organization in H.Q. seem to have taken form as yet. We invited Mr. Finger, the new Program Director for electric propulsion, to visit us as soon as possible for detailed discussions of the transfer. ✓

In the meantime, I began to familiarize myself with details of the Manned Lunar Project with the intent to find a new assignment for my group. ✓

→ But: Mr. Dixon promised me (and he seems to have an agreement with Abbott to this effect) that the OLVP - approved '62 LVT budget will not be subject to re-review by others. We can spend all of it, now! B

10-30-1961



Dr. von Braun:

I talked with Harry G. about converting the report into weekly NOTES to be included in your Monday morning report. He agreed entirely -

October 30, 1961

Page 000000048

Jan 10-31



WEEKLY HIGHLIGHT REPORT TO DR. VON BRAUN

FROM M-DEP-ADM

1. Senator Stennis, Mississippi, has requested a meeting between NASA and landowners in the Pearl River site on Wednesday, November 1, 1961. Kurt Berlin and Col. Berry will represent NASA. The landowners apparently want to know what restrictions will be placed on their activities in the restricted area (buffer zone). ✓

2. The RFQ on the Michoud housekeeping contract was issued to over 40 companies last week. ✓

3. The first Centaur contract was received from the Air Force. ✓

4. \$18.7 million was received and sent to Jacksonville District Corps of Engineers for purchase of first land acquisition in new area. ✓

5. \$500,000 was received from Headquarters to initiate design on the F-1 engine stands at Edwards. ✓

6. The pledges for the UGF Drive have passed (slightly) the goal of \$75,000. However, several thousand dollars remain to be collected. ✓

NOTES 10-30-61 KOELLE

B 10-30

1. MSFC CAPABILITIES IN SPACE SYSTEMS ENGINEERING

More than 200 reports have been submitted to this office for evaluation and inclusion into a 10-volume collection of technical reports, demonstrating MSFC systems capability. It is estimated that about 100 to 120 reports will be selected. Abstracts of the selected reports have been typed and will be compiled into an Abstract Volume. This Abstract Volume and a cover letter signed by the Director, MSFC, will be sent to Mr. Holmes later this week, stating among other things, that he can have the whole collection. These volumes should be ready for your inspection Tuesday afternoon in my office. Suggest you put it on your schedule.

2. PRESENT CONTRACT ACTIVITIES

meeting possible? Must leave town at 12:30 B

The following contracts are presently actively pursued (with termination dates):

- a. Launch Vehicle Size and Cost Analysis Study - November 30, 1961
- b. Study of Large Launch Vehicle Utilizing Solid Propellants - December 29, 1961
- c. Earth-Planetary Transportation System Study - April, 1962
- d. Earth-Lunar Transportation System Study - November 30, 1962
- e. Orbital Launch Operations Study - January 18, 1962
- f. Analysis of Medium Class (THOR, ATLAS) Launch Vehicle Systems - Jan. 14, 1962
- g. SATURN C-3 Launch Facility Study - November 30, 1961
- h. SATURN D Design Study - December 15, 1961

We are presently negotiating an extension of the Martin contract (item d) for a very detailed study on the problem of storability of propellants on the lunar surface. ✓

3. TV AND RELIABILITY

It might be wise to suggest that all future flights be televised because it obviously improves reliability (three TV shows, three successes). *Good idea*

4. SIDELINE COMMENT

I spent last weekend reading "ADVICE AND CONSENT" by A. Drury, a masterpiece on politics in Washington at a time the Russians are landing an expedition on the moon. Very interesting and revealing. Recommend you read it, if you have not already. ✓ *My wife has*

Do Large any unaware of this happened what have? B
 NOTES 10-30-61 DEBUS *Bib-30*

1. Charter of MSFC/STG Space Vehicle Board. The approved charter signed by you and Bob Gilruth has eliminated the "Lunar Landing Vehicle Board" of which I was a member and to which I had agreed and believed necessary for proper operation.
2. Explosive Equivalence Tests of A.D. Little. The latest preliminary test results of the $\text{LH}_2/\text{LO}_2/\text{RP-1}$ mixture indicates an approximate 25 percent equivalency. This appears to be more indicative of what we can expect in the event of a catastrophe on the pad here. Feel better now! ✓
3. MLLP Support at AMR. Davis proposes to establish a Deputy Commanding General at AMR whose organization would provide support for the MLLP. Have meeting scheduled with Davis to discuss this proposal and its impact on the LOD Test Support Office under Gibbs. ✓
4. NASA Headquarters Organization. Sam Snyder indicates great plans for Headquarters organization in Launch Operations. He obtained my analyses of Launch Operations which I presented to Seamans, and from it, deducted that he needs 50 people to operate. Need to talk to you and Seamans about this. ✓
5. Assignment. Col Clarence Bidgood, Corps of Engineers, reports November 1, for duty on my staff to handle matters for the Manned Lunar Landing between LOD and the Corps of Engineers. ✓
6. Labor
 - a. I understand that local unions will meet October 30 to recall the "non-strike agreement at the Cape." Opinion is that it will start a series of harassments against contractors with non-union labor. *Paul Styles*
 - b. Discussions are in progress concerning use of Civil Service personnel for portions of construction on Complex 37. I plan preliminary meetings with Styles and Gorman then will need guidelines from you concerning MSFC policy prior to November 14. *What's the latest on this?*

NOTES 10-30-61 CONSTAN

Bco-30

PERSONNEL

Mr. Arlin G. Smith has been employed as Assistant for Quality and Inspection. ✓

RENOVATION AT MICHOU

- a. Roofing contractor has begun and work is 15%-20% complete.
- b. Work is continuing on fitting/repairing screens and painting window trim.
- c. Present plans are to test interior water pipes Monday.
- d. Work has begun toward removal of partitions in shop area.
- e. There are 42-48 contractor personnel on work this past week. Expect 75-80 next week.
- f. MSFC representatives are quite satisfied with contractor's performance and economical operation. ✓

HOUSEKEEPING CONTRACT

The requests for proposals have been sent to 54 companies. Proposals are due in MSFC on November 7, 1961. ✓

S-1 CONTRACT

Seven proposals were received and are in evaluation process; anticipate meeting the contract date of November 15th. ✓

S-1B CONTRACT

Proposals are due in November 8th. Estimate announcement of selection about December 15th. ✓

MICHOU OFFICE AT MSFC

Three rooms at the east end of B-Wing, Building 4488 have been assigned to the MICHOU OPERATIONS and will be furnished and occupied November 6, 1961. ✓

NOTES - 10-30-61 - GEISSLER

Ba-30

1. IN FLIGHT EXPLOSION HAZARDS - THIRD MEETING: Fourth Meeting was discussed in last weeks notes. Summary of this meeting (3rd) is included as suggested by Dr. McCall.

The 3rd meeting between Combex and MSFC was held on 7 and 8 Sept. 1961 at Huntsville. Centaur questions were discussed on the 7th and Saturn questions on the 8th. The more salient results are summarized below.

a. Since the previous meeting, studies of the Centaur detonation hazards during separation put more emphasis on the alleviating factors, like vaporization of the condensed phases by the heat stored in the warm structure; vapor barrier forming between condensed H_2 and the warmer condensed O_2 , impeding immediate contact; sweep-out of condensed phases by the gas flow, etc. It was nevertheless agreed that with the present state of knowledge the desired degree of operational safety could not be assured. The separation sequence described in ref. 1 will therefore be abandoned, and the start of the chill-down cycle will be delayed until after separation. From Centaur #6 on, recirculation of the chill-down H_2 into the fuel tank is expected; the corresponding fuel saving will produce an increase of the vehicle performance. ✓

b. The start cycle of the J-2 engine was discussed with respect to potential hazards. Two start cycles are proposed. The first one uses only the tank head to start the engine; it is characterized by a slow turbine spin-up, needing 6 seconds to build up to full thrust; 80 lbs/nozzle of H_2 are dumped into the interstage before main stage ignition; presence of this H_2 would prohibit the use of pyrotechnic separation devices. The second cycle starts the turbine with compressed gaseous H_2 from a storage container. While mechanically a little more complex, this cycle compresses the thrust build-up to 1.5 sec and eliminates the dumping of H_2 with its potential hazards. It is therefore considered mandatory for manned flight application.

c. Remaining points of the Saturn S-IV separation were briefly discussed. It was concluded that, with the introduction of the H_2 -vent ducts, and the addition of a warm N_2 -purge in the interstage, the chill-down and separation cycle can be considered free of built-in hazards. ✓

2. FY 63-64 TULLAHOMA WIND TUNNEL TIME: At the request of NASA Headquarters, preliminary estimates of this center's wind tunnel requirements at AEDC, Tullahoma, Tennessee for FY-63 and FY-64 have been submitted. The total \$ value amounts to \$1,690,400 for C-4 programs (vehicle aerodynamics and base heating). The actual cost to MSFC may be zero for programs where the Air Force also benefits. ✓

α METERS FOR ATLAS-AGENA:

3. A The Atlas-Agena vehicle is scheduled to fly with side-boom-mounted α meters as recommended by AERO-E. The nose mounting of locals was preferred, but the payload (JPL) could not be touched. AERO-E will also arrange for wind tunnel calibrations of duplicate instruments since Lockheed did not plan any calibrations. GD/A is also being advised concerning Centaur α measurements. ✓

Minutes of Meeting between Combustion & Explosives Research, Inc., and MSFC on Saturn and Centaur Explosion Hazard Problems, 24, 25 and 26 July 1961.)
Memo, M-AERO-A, 18 Aug. 1961

Mr. Wendner
What's your reaction? B

Ba-50

NOTES 10-30-61 GRAU

1. P&WA COVERAGE BY QUALITY DIVISION: Per your comments on NOTES 10-16-61 (copy attached), Quality Division representatives met with Propulsion Projects Office. Details are covered in a memo to you; however, main points are as follows: 1200 deviations were presented with engine 1712 at time of final acceptance. P&WA will be requested to present discrepancies as they occur and we will increase participation during assembly. Presently at P&WA, we have one engineer on a semi-permanent basis and two inspectors were sent during the week of October 9th to analyze discrepancies on engine 1712. ✓
2. CENTAUR PROJECT: Two engineers have been assigned to San Diego for three weeks in support of this project. ✓
3. SA-2 STATIC FIRING: Excellent cooperation and teamwork with the other Divisions occurred during our participation in the checkout preceding the successful long duration run this week. ✓

Enc:

NOTES 10-16-61-GRAU

B4-30

1. SA-1:

a. Launch Coverage: Excellent coverage was provided in the Division for the launch. In addition to having a direct line for count down, TV's were placed throughout the building and the broadcast was video taped for play-back for those employees who did not have an opportunity of viewing the live version. ✓

b. Telemetry Records: Evaluation of records commenced immediately after receipt 10-28. Highlights of findings will be presented in 11-6 notes. Telemetry group in Instrumentation Development Branch was able to pick up approximately 4 minutes of TM starting at T + 117. Records were clear and indicated normal operation with good vehicle stability after cutoff. ✓

2. Buildup of Holmes Staff: We feel that the importance of the following offices needed in his organization should be stressed during the formularization of his staff:

- a. Moon - surface exploration.
- b. Radiation effects (Van Allen belt).
- c. Life Sciences (What are the real reasons for Titov's sickness).
- d. Intelligence Office (To accumulate Russian results and state-of-the-art as well-as their future intentions).

In addition, the planned Board and Working Group concept for handling the Saturn Systems Engineering and coordination between STG and MSFC should also be stressed. ✓

3. Centaur and Piggyback Test: G&C can start the requested study on the three stage Centaur only after sufficient investigation has been preformed by S&M and Aeroballistics. Evaluation of the probable causes for the malfunction of the computer in connection with the GSE must also be performed. To date, evaluation indicates computer went to stop mode when umbilical was ejected. In this mode very limited TM information is available. No further results were reported by GD/A other than the test was a "limited success." In-house evaluation of the performance of the inertial components is hard and time consuming because of the extensive automatic data reduction necessary. We have to depend heavily on GD/A evaluation for the time being. ??

4. SA-2 Static Test 10-24:

a. The ST-90 Stabilized Playform system, used in the static test, contained a cam type pitch program transmission (Pershing configuration). It was decided to utilize this type transmission to eliminate the control "kicks" derived from the normal pulse type Jupiter transmission. The transmission and the complete ST-90 system operation normally during the static test. ✓

b. Rate Gyro Test: (1) One 3-axis package was located in canister #15 (normal flight item). This information was telemetered. (2) Three additional 3-axis packages were located on top of spider beam in line with Fin II - IV. All were located on Fin IV side as follows:

- (a) Inside 105" barrel approx. 15" from C/L of long vehicle axis.
- (b) Inside 105" barrel approx. 40" from C/L of long vehicle axis.
- (c) Outside of 105" barrel approx. 70" from C/L of long vehicle axis.

(3) Preliminary test results tend to verify that spider beam in Fin II - IV direction is more rigid nearer the C/L of the vehicle long-axis. Although results of all vibration measurements have not been received by G&C, early evaluation indicates all three rate gyro locations acceptable from high frequency vibration standpoint. ✓

*Dr. Haussermann
What do you propose to do?
Letter to Jampay?*

NOTES 10-30-61 Heimborg

1. SA-2:

Bo-30

a. The duration acceptance static firing of SA-2 was successfully conducted on 10-24-61. No major discrepancies were found.

b. A LOX filling will be made on Tuesday, 10-31-61, to check the following items:

(1) Replaced No. 1 LOX pump seal.

(2) LOX tank slosh measurements with larger helium purge flows (Problem No. 41).

(3) Reinstalled No. 5 LOX pre valve.

(4) 0-2 and 0-4 LOX tank interconnect line seals.

c. S-1-2 will be removed from the stand on 11-4-61. ✓

2. MODEL STUDIES:

a. Pictures requested on last week's notes are attached.

b. West Area Deflector. Model tests with C-4 configuration at 1/59 scale confirmed a possible reduction of deflector exit uplift from 30° to 24° above the horizontal, eliminating one entire water manifold section. Studies of side wall pressure loading and impingement patterns at various gimbal positions are continuing.

c. VLF-37. Model tests with 1/20 scale C-1 configurations tested 60° and 70° included angle deflectors at various nozzle-to-deflector ridge distances in a continuing study of impingement and hot gas flow patterns.

d. Pressurization Tests under Slosh Conditions. Almost full-scale (78" dia. tank) LOX tank pressurization tests do not indicate catastrophic pressure decays due to "sloshing" with helium pre-pressurization. Tests to determine the quantitative pressure decay rate caused by sloshing with 5% initial ullage are continuing. ✓

3. J-2 TEST FACILITIES: Briefing requested on last notes will be given in person by Mr. Heimborg. ✓

ATTACHMENT 1: NOTES 10-23-61 Heimborg

B10-20

NOTES 10-30-61 HOELZER

1. PERT: Yes, the Computation Division PERT man is gone. His last day MSFC was 10-21-61. We are utilizing Mr. McGee from our ADPS Branch about 40% of his time in order to keep PERT going until we can obtain a man full-time for the job. (See attachment 1.) ✓
 2. ARMY SUPPORT: By spending \$352,000 of Support of Plant money we can make available from the SSE budget \$233,000 for the remainder of this fiscal year. Presumably this \$233,000 could be used to hire people. (See attachment 2 for details.) ✓
 3. THERMO-CHEMICAL DATA FILE: To get similar actions on other good ideas depends in most cases on the sponsor. All we can do is to encourage the Divisions to use our capabilities and methods and try to educate them in this field. However, in most cases the work is already being done manually by some supervisor and his people. To convince the supervisor that his work should be done minus his people plus machine is very hard and requires solid backing by all levels of management. In general, the application of ADPS (Automatic Data Processing Systems) methods requires usually a thorough overhaul of the old methods, often a change in the organizational setup and - in the many cases where a system is only feasible if it is done center-wide - unselfish cooperation of the Divisions. (See Attachment 3) ✓
- I just happened to stumble over an article in "Computers and Automation" (by the way - two very related fields) which seems to me to be worthwhile reading. It is written by a man from a soap company. (See Attachment 4) ✓
4. DATA REDUCTION OF SA-1: Reduction of the data from the firing is progressing reasonably satisfactorily in spite of delay caused by late delivery of data, power and equipment failures. ✓

Attachment 1, NOTES 10-23-61 LANGE

Attachment 2, Memo, subject: "Procurement of 7090 Time from AOMC"

Attachment 3, NOTES 10-23-61 HOELZER

Attachment 4, Article - "Total Systems Concept"

Refer to section 9000

NOTES - 10/30/61 - KUERS

B10-30

SA-D5 A requirement for a Dynamic Test Booster of SA-5 configuration has been established by Saturn Systems Office. This item was not planned previously because (A) it was believed that the existing dynamic test vehicle was sufficiently close to the SA-5 configuration and (B) the existing fabrication schedule was extremely tight. ✓

R&D Mr. Robert Keating, Senior Welding Engineer, Douglas Aircraft Corporation, visited this organization to discuss certification of welding operators and equipment to meet MSFC specifications. He also discussed some of the problems that Douglas is encountering in fabricating the S-IV and various other welding problems yet to be investigated. Some examples include (a) consistency in performance of welding equipment and controls, (b) repair welding, (c) hand welding, (d) evaluation of test weld for joint where tank, rear bulkhead and skirt come together, and (e) seam tracking and proximity control of weld torch when welding bulkhead joint. ✓

Facilities: Contract for precision equipment and model shop, bldg. 4711, was awarded this week. This will provide expanded facilities for precision machining and model work in the machine shop, and is to be operational about February 1, 1962. ✓

NOTES 10-30-61 Langa

B 10-30

I. PERT - S-I for SA-5 - We wish to clarify our NOTES on 10-23-61 by stating that although the present PERT network shows the vehicle some 18 months off schedule, this information cannot be considered valid until event duplications are eliminated from and parallel events versus series events are worked into the program. A quick look at the network last week showed event duplications have falsely added four to six months to the network. Several weeks will be required to finalize the network. Our control by bar charts shows S-I SA-5 stage some four to six weeks behind schedule as reported in NOTES 10-9-61.

Enc:

NOTES 10-9-61 Langa
NOTES 10-23-61 Langa

↑
That sounds better!
B

NOTES: - 10-30-61 - MRAZEK

B16-30

1. TECHNICAL EVALUATION OF APOLLO: - Five contractors were evaluated. After a close study of the proposals, it is evident that the Lunar Landing Stage and the Lunar Launch Stage should be technically supervised by Marshall. The interference with existing engine programs or establishing of realistic new engine programs should be monitored from here. ✓

2. F-1 ENGINE FACILITIES: - \$500,000 has been received to initiate work on acceptance stands; however, funds to support "deepened" program have not been released. ✓

3. J-2 ENGINE FACILITIES: - Funds are still not available. ✓

4. RL10 ENGINE: - A pre-negotiation meeting was held with the AF on 10-27-61 and negotiations with PSWA will begin on 10-30-61.

Dual engine tests have started at PSWA.

The A-1 PPRT is being delayed due to LOX pump troubles and propellant leakage during acceptance testing. ✓

5. RIFT: - The \$300,000 for conceptual design of facilities arrived at MSFC last week. ✓

6. RIFT: - The \$700,000 for vehicle R&D will be released with the approval of the Procurement Plan. ✓

NOTES 10-30-61 SMITH

B10-30

1. R&D PROGRAM AUTHORIZATIONS & COMMITMENTS (GENERAL):

All R&D program authorizations agreed to for the first half FY 62 in the September OLVP-MSFC Program Review have been received and commitment of funds is progressing at a satisfactory rate. A special effort is being made to accelerate commitment in the Launch Vehicle Technology and Electric Propulsion programs. ✓

2. NUCLEAR SYSTEMS PROGRAM:

Authorization of \$1.000M was received for this program October 24, 1961. This is the entire program for FY 62 and authorization was previously delayed by Mr. Rosen pending consideration of sufficient continuation of funds for the RIFT program in the FY 63 NASA budget. The \$1.000M is to be used (a) \$.300M conceptual study for the Flight Stage Test Facility at Nevada, (b) \$.700M for RIFT Development. ✓

3. LAND PURCHASE - CAPE CANAVERAL:

Allotment of \$18.700M was received by MSFC October 24, 1961 for 2nd and 3rd Quarter, FY 62 Land Purchase requirements at Cape Canaveral (for manned lunar landing program facilities). These funds coincide exactly with the estimates made by the Jacksonville District Corps of Engineers for land purchase during the 2nd and 3rd quarter. ✓

4. NASA PERT:

*How is this purchase handled in detail?
Thru District, thru LEO, thru PAC? B*

a. NASA PERT (SA-5 NETWORK): Integrated network for SA-5 obtained and refinement continuing with the help of Saturn Systems Office in replanning activities to improve initial network which reflects 18 months delay in schedule. Status of network as of October 26, 1961 is that certain refinements have been made with new computer output expected October 30, 1961. ✓

b. NASA PERT (TRAINING): Negotiations underway with University of Alabama to offer training at MSFC regarding fundamentals of NASA PERT. Course is tentatively planned in three phases. It is expected Phase I will start around December 1, 1961. ✓

Attachment No. 1 NOTES 10-7-61 HAEUSSERMANN

1. TRAVEL FUNDS:

The increase S&E appropriation allotment of \$4.603M received October 20, 1961 included an additional \$ 0.559M for travel; this is a 25.5% increase above the \$2.196M previously available for FY 62 travel and in the opinion of FMO and TPE will alleviate any MSFC travel problems. — Mr. Kero for info!! B

NOTES 10-30-61 Stuhlinger

B10-20

Dr. Stuhlinger
Suggest
you discuss
for a
little
write-up
(with picture)
Marshall
Star
B

1. OBERTH'S HONORARY DEGREE. Professor and Mrs. Oberth traveled to the Iowa Wesleyan College, Mt. Pleasant, under the care of Mr. George Bucher, on October 26. Professor Oberth received an Honorary Doctor of Science degree in a very dignified celebration on the same day when Sabana made its maiden flight. Mr. Bucher remained with the Oberths until they met their relatives in Chicago on October 28. Mr. Milton Cummings will be kind enough to pay for the commercial fare of the Oberths. ✓

2. SUPPORTING RESEARCH PROGRAM. The IBM analysis of the FY-1962 LVT program is now available. In the LVT program a total of \$2,397,413 for contracts has been processed by RPD against an authorized 1st and 2nd quarter total of \$6,896,000. \$66,579 has been processed for in-house equipment and material against an authorized 1st and 2nd quarter total of \$403,000.

Dr. Lundquist contacted members of the new H.Q. offices to informally discuss future supporting research programs at MSFC. Existing 1962 programs were not questioned. ✓

3. TRANSFER OF ELECTRIC PROPULSION PROJECT. Preparations were started to transfer the MSFC part of the NASA Electric Propulsion Program to Mr. H. Finger, and to other NASA segments to be designated by him. Mr. Finger plans to visit MSFC this week.

A four day meeting was held between MSFC and RCA personnel to discuss systems layout and wiring of the ion engine test capsule.

Ion propulsion appears to have become an Air Force favorite in the past few weeks if engine development and flight test funding is any indication. ✓

4. JOB OFFERS TO RPD. As a result of Headquarters decision to discontinue the electric propulsion project at MSFC, members of RPD are receiving job offers from government agencies, and from industry. So far, all concerned agreed not to commit themselves before (a) the electric propulsion project has been transferred in an orderly fashion, and (b) MSFC has had an opportunity to assign a new project to RPD. ✓

5. NEW ASSIGNMENT FOR RPD. I began to familiarize myself with the present status of the Manned Lunar Landing Program, with the tacit intention to find a new project assignment for the former members of the electric propulsion team. *Dr. Stuhlinger* Suggest you discuss this matter also with Mr. Maus. B

6. MISCELLANEOUS. Mr. W. J. Robinson of our Systems and Instrumentation Branch was host to the Telemetry Working Group of the IRIG for a four day meeting (October 23 through 26). Overall MSFC support for the group was excellent and the meeting was considered to be very successful. ✓